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ABSTRACT

Covering the period January 1 through June 30, 1976, this fourth and final semi-annual report of the first two-year grant for the Applied Fishery Science Program operating at Sheldon Jackson College in Sitka, Alaska presents the following information; Background (program objectives, advisory committee, and program staff); Program Progress (planning and coordination of educational program, student recruitment, program publicity, and funding sources and development of the academic program--curriculum courses, student performance and retention, and future students); Advisory Services; Aquaculture Facilities (introduction, pink salmon capture and handling, spawning procedures, chum salmon capture and handling, coho salmon capture and handling, incubation procedures and results, premature emergence, release of pink salmon fry, making program and future hatchery plans); Appendices (financial report, revised membership, technical advisory committee, the Chairman's report, and the Director's report). Major highlights reported in the summary include: a positive outlook for the future of salmon aquaculture in Alaska and development of career opportunities for program graduates; rapid growth of non-program use of the aquaculture facilities; provision of a $214,452 grant for the 1976-78 fiscal years by the Northwest Area Foundation; curriculum additions including Ocean Ranching I and II, Hatchery Practicum, and Fish Biology. (JC)

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SHELDON JACKSON COLLEGE FISHERIES PROGRAM

RC009911

DEVELOPMENT OF AN APPLIED FISHERIES SCIENCE PROGRAM FOR NATIVE ALASKANS AT SHELDON JACKSON COLLEGE

FOURTH PROGRESS REPORT

1 July 1976

Submitted by
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Sheldon Jackson College
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REPORT SUMMARY

1. Program objectives as outlined in the planning schedule approved by the Technical Advisory Committee were developed on schedule.

2. All indications are still positive for the future of salmon aquaculture in Alaska and the developing career opportunities for our future graduates.

3. Educational use of our aquaculture facilities in addition to the training of enrolled students grew rapidly this first year and is expected to become a standard function of the program.

4. The SJC Aquaculture Program continued to gain exposure through recruiting trips by the Director and other SJC staff, advisory services, participation in workshops and conferences, media coverage, and visits by elementary and high school students and counselors.

5. Recruitment efforts plus state agency salmon enhancement promotional activities resulted in 60 inquiries and 30 applicants for entry into the technician program for fall semester of 1976.

6. The Northwest Area Foundation has provided a grant of $214,452 for the fiscal years 1976-78 including funds to expand the teaching and egg incubation facilities. Project requests have also been made to the National Science Foundation and Sea Grant.

7. Ocean Ranching I and II, Hatchery Practicum, and Fish Biology were new curriculum coures taught this past year. The Hatchery Practicum as anticipated, proved to be especially valuable as a method of individualized instruction and introducing students to the realities of hatchery work.

8. The Aquaculture Facilities section is the report submitted to the Alaska Dept. of Fish and Game and describes the entire year's hatchery operation.

9. Approximately 1.6 million pink salmon fry were released and some 70,000 chum salmon are being fed for several weeks to be released at a larger size. About 11,000 coho fry are being reared for student instruction. These figures represent over 90% survival of the original eggs taken.

10. Some pink and chum fry were fin clipped to compare future returns on several different genetic combinations.

11. Hatchery plans for this year are to prepare a larger capture and handling area in the Sage hydroelectric tailrace and begin expansion of the teaching and egg incubation facilities.

INTRODUCTION

The Northwest Area Foundation in 1974 provided Sheldon Jackson College with a two-year grant to develop and establish an Applied Fishery Science Program designed for the needs of Alaska Native and non-Native groups participating in salmon ranching. The first progress report documented the efforts to define program directions and to establish liaisons with agencies and Native groups. The second report dealt with development of hatchery and teaching facilities, a fisheries curriculum, advisory services and student recruitment. The third report covered the first six months of hatchery and educational program operation. This, the fourth and final semi- annual report of the first two year grant covers the period January 1 through June 30, 1976 and relates the conclusion of the first salmon hatchery cycle and the school year.

Background

The history of private non-profit salmon hatcheries in Alaska and the need leading to the development of the Sheldon Jackson College hatchery technician training program has been recorded in earlier progress reports. It is gratifying to be able to report at this time that all indications are still positive for the future of salmon aquaculture in Alaska and the developing career opportunities for our future graduates.

About twenty individuals and corporations are presently developing salmon hatchery plans including the Tlingit and Haida Central Council, Shee Atika Corporation, Annette Island Reserve and other Native village corporations.

The State of Alaska through the Alaska Fisheries Council is encouraging the formation of regional hatchery corporations for the

orderly development of hatcheries over wide geographic areas. Regional planning provides a logical management unit for the enhancement of salmon stocks while protecting natural populations. A bond issue, if passed on the Alaska November ballot, will establish a revolving loan fund which would provide up to $3 million dollars for regional or $300,000 for individual non-profit salmon hatchery corporations to construct hatchery facilities. A seven year moratorium on repayment of principal and interest is a key feature of the package. Regional corporations could provide an excellent vehicle for commercial fishermen to participate in the perpetuation of their own livelihood especially those who would not have the individual time or resources to develop their own hatcheries.

Prince William Sound Aquaculture Corporation (PWSAC) was the pioneering regional hatchery corporation and has set a general pattern for others to follow. In Southeastern Alaska, the Southern Southeast Regional Aquaculture Association (SSRAA) has just incorporated and is currently advertising for an executive director and a business manager. In our own area, the Chichagof-Baranof Committee representing Shee Atika Corporation, Southeast Alaska Trollers Association (SEATA) and Sheldon Jackson College (SJC) is gathering information which like the others will be composed of fishermen, fish processors, scientists, city councils, and Native village corporations.

The Alaska Dept. of Fish and Game (ADF&G) is seeking approval on the November ballot of a $29 million dollar bond for construction of more public salmon enhancement facilities.

The Fisheries Conservation and Management Act of 1976 creates a 200 mile fisheries zone off the coasts of the United States. One of the possible benefits of Alaska salmon enhancement is the negotiation base that could occur between high seas salmon fishery

and the ground fishery not currently utilized by Alaskan industry but considered more valuable by foreign fleets. Reduction of high seas salmon fishing may encourage potential hatchery operators to feel they would not be just releasing salmon fry into a "bottomless barrel" for some other country's benefit.

It would appear that with this massive salmon rehabilitation upon us and good chances of success, the SJC hatchery technician training program is becoming established at an opportune time thanks to the foresight of the college administration, the Northwest Area Foundation and our many other benefactors. There is a need for skilled hatchery personnel and the career opportunities are at hand for their employment.

Program Objectives

The program objectives remain as originally formulated:

1. To promote Native Alaskan education by providing an educational career ladder for Indians, Aleuts, and Eskimos so that what they learn can be applied to a practical and meaningful vocation.
2. To enhance salmon stocks by establishing a private hatchery on campus to produce fish for the common property fisheries and as a source of self-sustaining funds for the program.
3. To promote cooperation among public and private organizations involved in the development of salmon ranching.
4. To provide technical assistance and advice to Native and non-Native corporations and individuals by sharing our own experiences and the knowledge gained from others.

Advisory Committee

To help guide the program directions, a Technical Advisory Committee was formed with Dr. William McNeil of the National Marine Fisheries Service in Auke Bay as chairman. (See Appendix B for revised membership). This Committee met in November of 1974 and 1975 and thereafter every May and November of each year to evaluate progress and offer suggestions for modifications (See Appendix C for Chairman's Report and Appendix D for Director's Report of the May 1976 meeting). The next meeting is tentatively set for November 16, 1976.

Program Staff

The following staff members are responsible for carrying out the program objectives: Mel Seifert, Director, is in charge of all operations; Dennis Lund, Instructor-Coordinator is responsible for developing and teaching the academic curriculum; David Bright, Aquaculture Supervisor, is in charge of the operation and maintenance of the hatchery, weir sites and student work crews; Mrs. Cathy Hanson is Administrative Assistant and Secretary.

Program Progress

This report covers the fourth six month period of the Aquaculture Program and concludes the first hatchery cycle and college teaching year. Program objectives outlined in the timetable of the second progress report were developed on schedule. The current activities are presented here under the topics of our primary objectives:

1. Planning and Coordination
2. Academic Program
3. Advisory Services
4. Aquaculture Facilities

Planning and Coordination

Three areas of activities will be described under this section:

1. Educational Programs
2. Student Recruitment and Program Publicity
3. Funding Sources

Educational Programs

January 9-11 - Seifert and Lund attended the Salmon Aquaculture Conference in Cordova, Alaska, sponsored by Prince William Sound Aquaculture Corporation, The University of Alaska Sea Grant Program, the National Endowment for the Humanities and the Alaska Humanities Forum.

January 22 - Jim Branson Law Enforcement Division, National Marine Fisheries Service, Kodiak, presented slide talk on foreign fisheries off Alaska to SJC students and local commercial fishermen.

January 25-31 - The Fishery Technology class took a field trip to Juneau where we visited the State coho rearing ponds near Mendenhall Glacier and the National Marine Fisheries Service facilities at Auke Bay. Then we went to Petersburg where the class toured the state coho and king salmon rearing hatchery and the processing plant of Petersburg Fisheries Inc.

February 9 - Presented salmon aquaculture slide lecture to Society of American Foresters.

February 20 - Dr. Behlke, Dean of the School of Engineering at the University of Alaska and Dr. Russel Jones, Director of Southeastern Senior College (UAJ) visit SJ Hatchery.

February 22 - Dr. McNeil, Chairman, Alaska Fisheries Council and Phil Daniel, Executive Secretary of the United Fishermen of Alaska speak at Centennial Building on regional hatchery concept.

February 22 - Salmon aquaculture slide lecture given to Southeast Alaska Trotters Association (SEATA). SJC Aquaculture Progam apply for associate membership in SEATA.

February 26 - Counselor James Jack and 20 Hoonah High School students tour facilities.

March 9 - Fisheries students field trip to Kotlon River to observe ADF&G personnel sampling in gravel for salmon fry.

March 12 - SJC staff sampling in campus hydroelectric flume for salmon fry for U.S. Forest Service.

March 14 - Salmon fry display in aquarium and other SJC Fisheries Program materials exhibited at Sitka Trade Fair.

March 17 - Lund attends Alaska Fisheries Council Meeting in Juneau relative to cooperative fishery education programs.

March 19 - Bill Wilson, U. of A. Arctic Environmental Information and Data Center here for listing of type and amount of data recorded by our program.

March 30 - Aquaculture slide lecture given to participants of SJC Village Management Program.

March 30 - Shirley Demmert and local cub scout troop tour hatchery facilities.

April 7 - SJC Career Day for college students. Dave Housewarth, Project Leader, U.S. Fish and Wildlife Service, represented fisheries and spoke on the importance of summer jobs and transferring from one government agency to another as a way of achieving a career goal.

April 11 - National Marine Fisheries Service seminar held in Aquaculture classroom to explain log book program for commercial fishermen to record sightings of marine mammals.

April 13 - Aquaculture Program Open House at hatchery to show young salmon prior to release.

April 14 - Sylvia Rockhill and second grade class tour hatchery facilities.

April 14 - Ray Smith and 11 Sitka High School students tour hatchery.

April 20 - Mike Ward and 20 second graders from Sitka tour hatchery.

April 22 - Dennis Fredrick and 8 Sitka High School students tour facilities.

April 27 - Ruth Ann Hoar and 12 Mt. Edgecumbe High School students tour hatchery.

April 28 - Seven patients from Mt. Edgecumbe Hospital tour facilities.

April 29 - Mr. Davidson and 20 5th graders from Pelican tour hatchery.

April 30 - Nancy Borton and ten Sitka High School Native students tour hatchery.

May 1 - Duke Ludwig and 8 high school students from Metlakatla tour hatchery.

May 19 - Ray Thorsen and 34 6th graders from Dillingham tour hatchery.

June 7 - Second Aquaculture Program lecture given to Village Management Workshop.

June 24 - Seifert attends Alaska Fishery Development Meeting in Sitka called by NMFS to initiate input on developing bottom fishery for Alaska relative to new 200 mile jurisdiction.

Efforts continue to coordinate our curriculum with that of the University of Alaska, Juneau, (UAJ) for smooth transition of our transfer students to their baccalaurate and graduate programs in fishery biology. During the May Technical Advisory Committee Meeting, Dr. Richard Gard, head of UAJ's Division of Fisheries was voted into committee membership and has accepted. This should provide maximum flow of information between programs for the benefit of all students concerned.

Much of the preceeding list of activities indicates that the aquaculture facilities could develop into an important educational tool for many more than SJC students. Considering the essentially spontaneous visitations that occured this year, it is obvious that with encouragement, the program could be exposed to a very large

number of people because of its easy physical access to anyone living in or visiting Sitka. It is a program application that should be pursued but will have to be controlled by preparation and organization rather than through random demands on staff time.

Student Recruitment

Recruitment for the second program year was greatly assisted by the promotional efforts throughout the state for private and public salmon enhancement by such notable agencies as the Governor's Office, the Alaska Fisheries Council, and the United Fishermen of Alaska. This plus favorable publicity on the SJC hatchery operation has made the educational program widely known among high school educators, Native corporations, and salmon hatchery operations.

Personal visits by the director were made to Cordova, Juneau, Petersburg, Ketchikan, Metlakatla, and Mt. Edgecumbe high schools. Visitations to other schools on the behalf of Aquaculture and other SJC programs were made by Dave Nutting, Chairman of the Science Department, and Russ Millette, Director of Admissions.

Students and counselors from the school systems of Mt. Edgecumbe, Sitka, Dillingham, Hoonah, Pelican, and Metlakatla learned of the program first hand by touring the hatchery.

The SJC hatchery program is listed in the BIA manual for approved vocational training courses for Alaska and Bureau of Indian Affairs personnel visited the hatchery several times this past year.

The Director participated in Career Day at Mt. Edgecumbe High School and a revised Aquaculture Program brochure was sent to all public and private high schools in Alaska.

As a result of recruitment efforts and publicity approximately 60 inquiries and 30 applications were received for entry into the

technician program for the fall semester of 1976. This number is beyond the capacity of our present physical space and staff and job opportunities so we are shooting for an enrollment of 20. Alaska Natives and residents receive highest priority in admission to the program.

Program Publicity

Additional activities are listed here under the heading of publicity but obviously those in the sections on educational programs and recruitment also publicize the program.

January 10-13 - SJC staff invited to attend the First and Third Salmon Workshop in Juneau and display materials about the Aquaculture Program.

January 21 - James Brooks, Commissioner, Alaska Dept. of Fish and Game, visits hatchery.

March 14 - Fisheries display at Sitka Trade Fair.

March 26 - Kathryn Kyle publishes story on SJC hatchery in SEATA Newsletter.

April 7 - Al Eagle, Alaska Dept. of Environmental Conservation, visits hatchery.

April 12 - Jon Rowley, co-chairman, Southern Southeast Regional Aquaculture Association, visits program.

April 13 - Pat Roppel writes story on SJC Aquaculture Program for June issue of "The Sea Alaskan".

April 21 - Word is received that information on the SJC Aquaculture Program has been included in "Science Education for Minorities: A Bibliography" by the American Association for the Advancement of Science.

April 22 - Jon Nyhern, Director of Public Relations for SJC, writes story on Aquaculture Program.

May 7 - Lt. Governor Lowell Thomas Jr. visits hatchery.

In addition, many commercial fishermen as well as other friends stopped in throughout the year.

Funding Sources

The Northwest Area Foundation has continued its pioneering support of the SJC Aquaculture Program by announcing in May a grant of $214,452 for the fiscal years of July 1, 1976 to June 30, 1978. Included is funding for enlarging the teaching space and increasing the incubator capacity to self-sustaining size.

These same building funds were requested from the Minority Institutions Science Improvement Program of the National Science Foundation. Any amount that might be awarded from NSF for hatchery building purposes is to be subtracted from the Northwest Area grant.

On June 22nd, the director went to Southeast Senior College in Juneau and presented a project proposal to the site visit team for the Alaska Sea Grant Program. In this proposal funds were sought to hire a second fisheries instructor and student lab assistants and to collect estaurine data near the Sheldon Jackson hatchery using our students and staff. We will begin advertising for the instructor pending notification of funding sometime in August. Actual grant award is not made until November 1 due to the fiscal year schedule of federal agencies.

Annual sources of program funds are contributions and student tuition. Efforts will continue toward locating funding which may be needed until hatchery salmon returns become self-sustaining.

ACADEMIC PROGRAM

At this writing, one full school teaching year has been completed and an evaluation of the results is possible. Four courses were offered during the 1975-76 school year. Ocean Ranching I, Ocean Ranching II, Hatchery Practicum and Fish Biology. Starting next year, the names of the first two will be changed to Fish Husbandry I and II.

Hatchery Practicum

Students accepted into the program were asked to arrive one week before the regular school semester began so that they could participate in salmon trapping and spawning acitivities. The normal school year starts after most of the pink salmon spawning has occured. Thus, the pre-school time is the only opportunity for the students to gain hands-on experience in tending traps, judging fish ripeness, egg taking, and stocking of incubators. This experience was included under Hatchery Practicum and the participants were given 1 credit for it. All students must experience this spawning activity at least once during their training to receive a certificate or degree.

Five students arrived early for the spawn taking activities. They received extremely concentrated training, with each individual spawning approximately 100 fish and spending 30-40 hours tending the trap, sorting and spawning salmon and stocking the incubators. By the time "regular classes" began they were capable of conducting spawn taking activities with minimum supervision. This training was facilitated by the large and unexpected run of fish entering the hydroelectric tailrace.

In 1976-77, the hatchery practicum experience will be even more meaningful because the facilities completed by fall will enable a more varied hatchery work schedule. There is only enough variety in the fish spawning sequence to justify one week of intensive pre-semester activity. However next fall, the semester begins two or more weeks after the major spawning season. With only a portion of the students present, it is impossible to begin full time fisheries course instruction ahead of the regular semester. It is also impractical to expect students to quit summer jobs early and pay room and board in Sitka for 2-3 weeks for only one week of fish spawning activity. When these schedule difficulties are combined it becomes imperative to maintain maximum flexibility in scheduling the pre-semester spawning activities. As a result of the above considerations, we will ask new students to arrive August 30 and will count on late pink and chum salmon and a few coho to provide spawning technique training.

In 1976, this may pose difficulties as an extremely low salmon run is predicted and we may have to take all the fish we are allowed whenever we can. In subsequent years, however, we should have ample fish returning to the hatchery and sufficient incubator capacity (8-10 million) to risk delaying the taking of 2-3 million eggs until after school begins.

Additional Hatchery Practicum during the regular school session was begun spring semester. For Hatchery Practicum credit beyond that received for the pre-semester spawning activity, the students each reported for duty 3 hours a week and assisted with hatchery chores and construction. Activities included egg picking, tray cleaning, hatchery equipment construction, water quality, data taking and fish marking. The Practicum has the potential of

providing the most meaningful training to the students. Some students complained of being cheap labor or of being required to do construction work they already knew well how to do. However, the true hatchery routine consists of as much or more scrubbing, cleaning, maintenance, and construction as biology. Some students will decide at this point that hatchery work is not for them. It is important that they be allowed to experience this as hatchery managers have stressed that the ability to be a willing, hard worker is more important to them than technical expertise, especially at an entry level in hatchery employment.

The Fisheries staff were able to observe student punctuality and willingness to work under those conditions and hence judge the students as potential employees, very useful observations when recommending the students to employers.

A much improved spawning shed and fish ripening area at the hatchery as well as development of Sage wet lab with drip, trough, deep matrix, and additional vertical tray incubators will insure even better and more varied experience for the students than last year. Also, we will have some cohos to be cared for throughout the year. The presence of student laboratory assistants will reduce the time required by David Bright and Dennis Lund to supervise the practicum sessions, and those scheduled as laboratory assistants will receive considerable educational benefit from the experience.

Ocean Ranching

Ocean Ranching I was taught fall semester, Ocean Ranching II, spring semester. The Ocean Ranching I and II classes consisted of three 1 hour lectures and one 3 hour lab each week. Fall semester the students worked in pairs on an egg incubation project where they were given a group of 400-600 pink salmon eggs and required to design

and build an incubator for them from common, inexpensive materials. From this project they observed salmon embryo development, siltation, water flow distribution irregularities and sensitivity of eggs to shock. This was very useful experience and continuing effort will be made to incorporate individual student projects into future course work.

As the hatchery expands to 10 million egg production capacity, a larger proportion of the hatchery's egg take can be devoted to student lab exercises. It is hoped that we can give each student at least 2,000 eggs to work with this year.

Other Ocean Ranching I and II labs covered egg enumeration, water hardening and early embryonic development of eggs, chemical treatment of eggs, flow rate measurement, oxygen, pH, and other water quality measurements, gravel sampling of pink salmon spawning areas, and determination of carrying capacity of hatchery fish rearing units based on biomass, size, and oxygen consumption data.

Ocean Ranching lectures covered the material in "The Salmon Rancher's Manual" by McNeil and Bailey, "Trout and Salmon Culture" by Leitritz and "Culture and Diseases of Game Fishes" by Davis.

The subjects of fish disease diagnosis, treatment, nutrition and economics were not adequately covered in Ocean Ranching I and II due to press of time. It is planned to give a course in Advanced Fish Culture if Sea Grant funds an additional instructor. These subjects plus culture of non-salmonid species will be covered in that course. If the Sea Grant funds do not provide an additional instructor, the disease and nutrition material will have to be presented in the Fish Husbandry I and II courses. Hopefully increased experience and organization of the instructor will allow the other material to be presented more rapidly and effectively so this additional information can be provided. However, there is a very high risk of losing the lower level students if the pace is increased and the new course would be much preferable to increasing the content of the fish husbandry courses.

Fish Biology

The Fish Biology course lectures focused on traditional fish anatomy, physiology, and behavior. Dolly varden, char, rockfish, and clams were dissected in labs. There were three one-hour lectures and one three-hour lab per week. The course covered fish anatomy and physiology in detail. Originally, it was planned to cover fishing methods, statistics, and processing in the class but because many of the students had received that information in the Fisheries Technology course during the interim before, that material was eliminated.

Less advanced students could not handle the vocabulary in texts, lectures, and dichotomous keys and could not understand any but the simplest and most basically stated test questions. As a result we intend to limit entry into Fish Biology to those students with a C or better in Biology and Basic English.

The Fisheries Technology course and the Fish Biology course will be combined into Fish Biology in 1976-77. Discussion of fish anatomy and physiology will be in less detail, and the commercial fishing methods and life cycles of commercially important species of fish and shell fish will be included. This will make a full one semester course. If the amount of material is judged to be too great upon examining the results of the spring '77 class, consideration will be given to splitting it once again into Fish Biology and Fisheries Technology if an additional fisheries instructor can be hired.

At the present time however, the course load from the existing fisheries courses is such that the students are given little latitude in their studies and the achievement of an Associate Degree in two years will be a demanding schedule if Advanced Fish Culture, Fisheries Technology, Marine Biology, and Chemistry are all required courses. A student who can finish this schedule in two years will be a highly competent technician.

A tentative plan for the future, if the additional fisheries instructor is funded, is to have the new instructor teach one section of Fish Husbandry I and II, supervise half the field projects and Practicum, teach Introductory Fisheries Science and Advanced Fish Culture. The present instructor would then teach one section of Fish Husbandry I and II, Fisheries Technology, Fish Biology and supervise half the Practicum and field projects.

Introductory Fishery Science

The Introductory Fishery Science course is in the process of being prepared this summer. It is not anticipated that there will be a problem with widely varying student ability or background. Students who have shown difficulty in basic mathematics and biology will not be encouraged to take this course and it will be taught as a typical sophomore level college course but emphasis will be on field techniques. Students with poor communication and basic science skills cannot accomplish the course objectives.

Student Performance and Retention

The greatest difficulty in teaching last year was in dealing with the diversity of student academic background. We had students who could not write a complete sentence or understand a simple test question and students who were capable of doing college work at any university. The situation will be equally challenging next year. At least two of next fall's students have a Master's degree, whereas other have much less educational background.

Many of the Native students, more proportionally than the non-Natives, come to SJC with very poor academic training. It appears that this difficulty with basic communcation skills is the greatest problem the students have, especially the Natives from

rural areas. The entry levels of reading, writing, mathematics, and study skills of these students precludes their achieving an associate degree in two years.

Several of the fisheries technology students were carrying the equivilant of 18-24 hours of classes, but among those were non-credit courses: Basic English, Basic Math, Reading Improvement and Study Skills. This left little room for Biology, Fisheries and electives.

The instructor's greatest challenge was conducting lecture and lab exercises which did not discourage the lower level students and/or bore the upper level students. This situation will be eased as increasing individualization of instruction thru individual projects and more self-learning activities free more lecture time for discussions. Typical college lectures cause difficulties for students with poor communication skills, so this type of presentation will be de-emphasized in the basic hatchery courses as much as possible.

It is hoped, in addition to providing packets of copied and reprinted material (there is no single good, sufficiently detailed, up-to-date salmon culture textbook), that in the next two years some programmed materials can be produced so that students can learn aquaculture concepts at their own pace.

The fisheries instructor is attempting this summer to devise a suitable method of student evaluation that permits students in the fisheries classes to achieve at their maximum without penalizing students of lesser motivation and academic background. This will incorporate some form of variable credit method of certifying student achievment.

Of the 16 students who started the Ocean Ranching Techniques class last semester, 11 considered themselves aquaculture technician students planning to at least start the full 2 year aquaculture curriculum. Two more were second year SJC students interested in fisheries but not planning to complete a full two years of fisheries course work. One individual planned to build a hatchery and was interested in taking only the Ocean Ranching course. This individual, doubtless due to his well-defined goal, was the most highly motivated of all the students. Two were planning to transfer to a four year school to pursue a bachelor's degree in fisheries and wished to get some hatchery background. By the end of spring semester, the two transfer students had made firm plans, one to enroll in the Fisheries Program at the University of Washington, the other at UAJ. The two second year students finished 2 years at SJC but neither graduated. It is not known whether or not they will be back next fall to complete graduation requirements.

One of the registered technician students never showed up for classes. One dropped out fall semester because finishing his high school diploma and taking college courses at the same time was too much for him. A third decided he was interested in liberal arts rather than fisheries and dropped out of the program. Another student who was receiving failing marks did not return to school at all spring semester. Another student quit part way thru spring semester due to financial reasons. A fifth student was asked to leave by the school for academic and disciplinary reasons. One stated that family problems compelled him to go home. He did however, express satisfaction with SJC and interest in the fisheries program and hoped to return.

The second semester ended with 5 students finishing both Ocean Ranching and Fish Biology and one auditing the Ocean Ranching course.

The attrition rate bears examining. There appear to be at least three reasons for the attrition:

1. Only 4 or 5 of the students entering the program were highly committed to an aquaculture technician career. The others were very uncertain and were taking the Ocean Ranching course because Aquaculture is an intriguing subject they wished to explore.
2. Only 5 or 6 of the students were capable of doing college freshman work without further preparation. Several received one or more D or F grades and nine were required to take remedial courses which precluded their beginning the fisheries technician curriculum courses in sequence.
3. Students of various motivation levels can be disillusioned about the career level that can be attained by one with an associate degree or certificate in fisheries. Some highly motivated students of low academic ability dislike the hatchery routine, which in some cases requires long hours of hard manual labor outdoors, much like farm labor.

Highly motivated students of high academic ability may tend to become transfer students and leave the technician program to become "biologists". However, non-Natives will need a Masters degree to ensure securing a permanent biologist position in the fisheries field.

Interestingly, only two of the fisheries students made a serious effort to obtain summer work in fisheries although there were several job opportunities available this summer. The rest went home for vacation or took other jobs. This is despite repeated urging by the professor of the importance of fisheries related work experience on one's resume. Next year, the fish husbandry

courses will have an even greater emphasis on employment potentials and the completion of employment forms. While it is undesirable to push students into seeking work if they do not have sufficient motivation to do so themselves, class assignments last year showed that only one of the fisheries students knew how to prepare a resume or present oneself well on a state or federal employment

Future Students

Last year, despite widespread publicity and recruiting effort few highly motivated students of good academic abilities enrolled in the program. All applicants were accepted, however, to meet enrollment goals. The group who have expressed interest in the program for next year appears to contain several persons of very high academic and motivational potential.

As major hatchery runs return, the interest and exposure of the public to hatchery technology will be greatly heightened and more people will consider the profession.

The expansion of hatchery development in Alaska will open increasing numbers of responsible, challenging positions for persons with two years of college education. These factors should increase the number of applicants for the Aquaculture Technology program and enable greater selection by the staff of incoming students.

ADVISORY SERVICES

Advisory services tend to blend in with other activities listed as educational programs and publicity but some are more directly concerned with consultations on Aquaculture techniques, criteria or educational programs.

Several potential hatchery applicants have consulted with the aquaculture staff such as Warren Weathers and Herman Kitka of Shee Atika, a local Native corporation spearheading the creation of a regional hatchery planning corporation for our area. Alaska Aquaculture Foundation has recently received their hatchery permit and are seeking support through the Comprehensive Employment Training Act(CETA) to sponsor students to our training program and for summer jobs at their hatchery site. Ross Soboleff, the new Director of the Office of Development Planning for the Tlingit and Haida Central Council visited here to learn of possible applications to their planned hatchery. Mr. Soboleff is also a member of our Technical Advisory Committee.

Interest in salmon aquaculture has reached a point where educational programs of a limited scope are being added to high school curricula around the state. Kathy Anderson, Chairwoman of the Indian Education Committee from Cordova discussed high school program possibilities with us as did Carolyn Neese of Angoon. These programs, like the first one at Sand Point in the Aleutians, would probably be funded thru Johnson O'Malley funds if approved. The SJC aquaculture staff believe high school programs in aquaculture are a good concept and a logical extension of marine biology coursework that should be offered in a state that has 70% of the outer continental shelf area of the United States. However we do hope such programs are

administered judiciously so as not to be substituted for or interfere with the attainment of basic communication skills vital to success in any career.

Darrel Tracy of the U.S. Forest Service discussed salmon culture and hatchery site criteria with our staff as part of the preparation for evaluation of potential environmental impact of hatcheries on proposed sites. Most hatcheries will by necessity be developed on Tongass National Forest land in Southeast Alaska as there is relatively little private land with hatchery site potential although Native land claims could change this. Consequently most hatchery sites will require at least Environmental Impact Statements and if this indicates significant impact will occur, an Environmental Impact Report will be necessary, a process which takes nine months or longer to complete.

Jon Rowley, co-chairman for the newly incorporated Southern Southeast Regional Aquaculture Association, was here gathering information during the development of their regional hatchery planning organization based in Wrangell. Educational program presentations have been requested by this group next fall after fishing season.

AQUACULTURE FACILITIES

Introduction

One of the requirements of our private, non-profit salmon hatchery permit is that the Director submit an annual report to the Commissioner of the Alaska Dept. of Fish and Game by June 15. Condition 10 of this permit describes a specific list of the minimum information that must be included. This section is that report which was submitted and describes the entire past year's hatchery operation chronologically from capture of adult salmon last fall to release of young fry this spring.

This is basically a report on the biological-physical aspects of the salmon hatchery operation and does not elaborate in this section on the student-staff involvement. It should be emphasized that all phases of our operation are utilized for their training potential and whatever activity the staff performs is usually done to a greater degree by the students. The fact that we achieved a high level of egg incubation success during this first year of operation can be attributed in part to the student's ability to attain a high degree of skill through intensive on-the-job training in a relatively short period of time. Having familiarized ourselves with one cycle of Alaska style salmon ranching, the staff looks forward to an even greater emphasis on the educational aspects in the coming years.

Hatchery Facility Description

Water supply from Indian River and a Netarts-type incubation system were constructed as described in items 9a-d and figures 1-5 of the final hatchery permit application to the Alaska Dept. of Fish and Game. In addition, water was piped into a basement room of Sage Building located adjacent to the incubation boxes. This room is primarily used for teaching salmon hatchery techniques to the students enrolled in the technician training program. During the course of training in this room we used four 8' Neilsen aluminum hatchery troughs, 2 Heath incubator sets, six 50 gallon rearing drums, two 4' x 8' x 1' plywood rearing boxes and several aquaria.

During May of 1976, construction began on a pumped salt water system which when completed will give us the ability to circulate seawater from Crescent Bay into aquaria and fish tanks in Sage Building. The seawater line will also be connected to the current incubator boxes to provide another emergency water supply and a possible future use of saltwater as a fungus control agent for the eggs.

Salmon Capture and Handling Procedures

Our egg taking plans called for obtaining donor stream eggs from Katlian River, South Fork by capturing female salmon with the aid of a wood slat weir. The eggs were to be transported unfertilized back to the SJC campus hatchery then fertilized using males captured with another weir on Idnian River, thus providing genetic input from the "home" stream population. Table 1 lists the chronological sequence of the 1975 salmon runs relative to the SJC hatchery operations.

Pink Salmon Capture and Handling

As it turned out, the weirs did not play a significant role in obtaining pink salmon eggs in 1975 because a run of some 2500 pink

Table 1 Chronological list of events relative to 1975 salmon runs and SJC hatchery egg take.

July	12	Pink salmon reported seen in Starrigaven Bay and Mosquito Cove. None yet in upper Katlian Bay or Indian River.
	16	Sports fishermen catching bright pinks near shore at Starrigaven Bay.
	23	Pink salmon seen jumping near mouth of Jumper Creek, a small tributary mid-way into Katlian Bay.
	26	A few pinks in Upper Katlian Bay and first two sighted in intertidal area of Katlian River, South Fork.
August	5	First report of pinks in intertidal area of Indian River.
	11	First spawning of pinks in Indian River.
	12	Two pink salmon males in tailrace flume trap First pair spawning tailrace gravel. Pinks spawning intertidal area of Katlian River, South Fork.
	15	220 pink salmon counted in Indian River; sex ratio about 3:1 male to female.
	18	40 pinks in tailrace trap 476 pink salmon in Indian River; sex ration 3:1
	19	11 pinks spawned from Tailrace
	20	606 pink salmon in Indian River.
	21	69 pinks spawned from Tailrace
	22	108 " " "
	24	34 " " "
	25	72 pinks spawned from tailrace 1178 pink salmon in Indian River a few chums in South Fork.
	26	61 pinks spawned from tailrace

August	28	96 pinks spawned from tailrace
	29	132 pinks spawned from tailrace
	30	204 pinks spawned from tailrace
Sept.	1	Female chum in tailrace trap
	2	204 pinks spawned from tailrace
	3-5	ADF&G transported 600 pink salmon from tailrace trap to Indian River above diversion dam
	8	Two chum males in tailrace trap
	9	SJC weir at South Fork washed out
	18	2400-3000 chum counted in South Fork past third logging bridge. 2000 counted in first mile of Nakwasina River.
	22	Received permission to take 150 chum females from South Fork
	24	Attempted seining for chums on beach near South Fork River mouth in intertidal area and up river.
	29	Began operating trap boxes with wire mesh wings in South Fork for chums.
	30	Strong winds and heavy rain. Caught 23 female and 10 male chums in South Fork. Had to remove box traps due to rising water.
October	2	Began cleaning eyed pink salmon eggs at hatchery. Spawned 24 female chums at South Fork and brought eggs and milt to hatchery before fertilization. Water began to recede at South Fork.
	6	Spawned the one chum from tailrace. Katlian Bay empty of pinks and chums.
	9	7 female coho and 3 male coho captured by seine in Indian River above diversion dam and held for ripening. Spawned October 20,21,23 and November 3, 10,13

salmon entered the tailrace of the SJC hydroelectric flume located adjacent to the hatchery. Presumably they were Indian River returnees attracted to this diverted Indian River water. Some unknown portion of these may have actually originated in the tailrace as a local long-time resident, Mr. Leslie Yaw, reported that surviving emergents were found in the tailrace gravel cleaned out of the flume each spring since the 1930's. Runs of more than a few have entered this tailrace during other years according to SJC personnel but very few were seen there or in Indian River during the two spawning years prior to 1975 leading to speculation on the part of some individuals as to the heredity of this past year's run. A run of several thousand pink salmon also occured in Indian River last fall.

At the hatchery site pink salmon were captured using a V-shaped wire fyke trap between the cement walls of the hydro discharge flume, a capture area 8 feet by 32 feet long. These salmon were then dip netted, sorted by sex, and held in 4' x 8' x 4' cages made of 1" x 2" wire mesh with wooden frames in a pool area below the flume. The entire 250' tailrace and flume are within the intertidal area but high tides did not cause us any capture or holding problems.

During the first days of the pink salmon run into the tailrace, we tagged both males and females with numbered Floy tags attached through the dorsal fin to gather some data for future reference on how long a female had to be held before ripening and on how long a male could be held before he started to deteriorate and could no longer be used for fertilization. A total of 497 males were tagged in chronological order of their capture. We handled the males at least three times and held them at a denisty of 150 per cage in 6 - 10 degree C. water for up to 2 weeks with a loss of one dead and one other beginning to deteriorate. By that time our spawning was over and we released a number of them and used others for length-weight data.

Females were generally ready for spawning the same day of capture or within 2 days and nearly all males were ripe at capture. On August 19, during the early part of the tailrace run, we tagged 110 females and later recorded days to ripening as shown in Table 2. As the run progressed, the percentage of females ripe on day of capture increased.

Female pre-spawning mortality was low as might be expected because of their short holding time. A total pre-spawning mortality of about 30 males and females occurred during the two-week spawning period due mainly to those few that became exhausted swimming against the water current in the flume trap and were pressed against the downstream screen.

The length-weight statistics on the 1975 pink salmon utilized in hatchery spawning are listed in Table 3. Female weight was taken prior to egg removal. Numbers of fish captured during the earliest days of the tailrace run are too small for valid statistical analysis but the apparent trend was that small males and females entered the run first. No data was taken on the few Katlian males utilized.

Spawning Procedures

Spawning procedure for pink salmon at the hatchery site was as follows. Staff and students sorted salmon by sex and placed them in holding pens positioned in a pool area downstream from the flume trap. On each day of spawning, females were sorted as to ripeness which was determined by holding a female belly up and applying slight hand pressure. This position prevented wastage of eggs if the female was very ripe. If a few eggs did not come out easily and loosely, the female was rejected and returned to a holding pen to be checked again at the next spawning session. Those that were judged to be ripe were stunned by a blow on the head and carried into the hatchery

Table 2 Time to ripening from tailrace Pink Salmon females tagged August 19, 1975.

# days from capture	0	2	3	5	6	7	9
% of 110 females ripe	9	56	15	7	5	6	2

Table 3 Length - Weight data on 1975 pink salmon from SJC Hydroelectric tailrace and Katlian River, South Fork. Length measured from mid-eye to fork of tail.

Females	Length (cm.)	Weight (kg.)	Sample size
Indian R.	Average 50.5 Range 42.3-58.2	Average 1.80 Range 1.00 -.2.36	466
Katlian R.	Average 50.2 Range 44.5-57.7	Average 1. 2 Range 1.09-2.77	32
Males			
Indian R.	Average 50.8 Range 41.4-61.0	Average 1.98 Range 0.86 - 3.86	210

training room of the Sage Building basement. The eggs of approximately three percent of the females were found unusable either due to not being ripe enough or ovarian hemorrhage. Fish were weighed with a hanging milk scale and measured from mid-eye to fork of tail, then were bled to eliminate blood from the later fertilization process. This was done by cutting the caudal artery and laying the fish on a wire mesh bleeding table. The wound was flushed with water once to prevent premature clotting. The cut was made on the dorsal side so that the wound would not later be hanging over the egg bucket. The one man method of spawning was used in removing the eggs with a cut from vent to gill area. Each fish was spawned into a separate clean bucket and if the eggs were satisfactory and no extensive extraneous matter present, they were combined into one bucket until the total from 12 females had been collected for fertilization. This particular number of eggs was pre-determined by the amount which would provide a single layer on each incubation tray. Sperm from 12 males was gathered into a clean container and either used immediately to fertilize a bucket of eggs or stored for a short time in an ice cooler for later use. This latter method was also utilized in bringing eggs and sperm from Katlian River, South Fork, back to the hatchery. Eggs were transported unfertilized in gallon plastic jars and sperm in whirl pacs, both kept in ice coolers, but not in direct contact with the ice. Four hours was the longest time period any sperm or eggs were held prior to fertilization. Sperm and water were added to a bucket of eggs at the same time and after 5-10 minutes, the excess milt and any other debris were washed off. Many fertilized pink salmon eggs that were not water hardened fell through the 1/4" Vexar mesh of our egg trays. Therefore, 15-20 minutes of water absorption was needed before pouring the eggs onto each tray already positioned beneath the water in a Netarts-type incubation box. The eggs were then spread into single layers using feathers. Spawning at Katlian River, South Fork, followed the same procedure and took place under the protection of a spawning shed roof at streamside near the weir site. Salmon

were held in pens like those at the hatchery site tailrace. No unusual loss of eggs from the tailrace or Katlian River occurred prior to their placement in the incubators.

Pink Salmon Spawning Results

Fecundity was established at 1611 eggs per female. This figure was averaged from periodic volumetric measurements of the entire output of one female or a sub-sample thereof, followed by manual count of the unfertilized eggs prior to water absorption. Volumetric sub-samples were found to estimate the true number of eggs with a possible error of ± 1.75%. Table 4 lists data on 1975 egg take.

After we stopped spawning pink salmon, ADF&G personnel from the local office of Commercial Fish Division transported some 600 salmon from our trap to Indian River above the SJC diversion dam to further enhance natural reproduction.

Chum Salmon Capture and Handling

The chum salmon run was virtually non-existant in Indian River, with less than a dozen being reported. One female and two males were caught in the flume trap. The run at Katlian River, South Fork, was less than desired for escapement. Just prior to receiving ADF&G permission during the late stages of the run to capture 150 of the 400 females requested, our weir washed out. Because of the time factor relative to the salmon run, the difficulty of building a weir under high water conditions and the uncertainty of permission to capture any chums, we decided not to repair the weir but to try other means of capture if the opportunity arose. We considered various options and when permission was given, we first attempted seining. We tried seining on the bay beach and in the lower and upper intertidal areas of South Fork. Results

Table 4 1975 Pink Salmon egg take for SJC Hatchery

Female Source	# Females	# Eggs Produced	# Males	Male Source
Indian River	991	1,596,500	707	Indian River
Katlian River, S.F.	69	111,160	69	Indian River
Katlian River, S.F.	25	40,275	15	Katlian River
Totals	1085	1,747,935	791	

were always the same - many pink salmon with their teeth entangled in the net and one or two chums. The pinks were numerous enough to be a nuisance and the chums too few to achieve any sort of capture efficiency. We next checked several miles upstream for possible spawning concentrations but again the chums were too widely scattered to efficiently gather eggs especially without employing the questionable technique of walking on a great deal of spawning area and possibly killing buried eggs. We therefore settled on building one to three temporary mesh trap boxes with long leader wings and staggered them across the stream at the weir site. This technique was working and caught 31 females and 10 male chums in a few hours. However, on that first day of trapping, the river began to rise from heavy rains and the traps had to be removed. When the water receded again 2 days later, the bay and intertidal areas were empty of chums and the salmon runs were over for 1975.

Chum Salmon Spawning Results

A total of 75,000 eggs from Katlian River, South Fork, were incubated in a shallow matrix box. About 2000 eggs from an Indian River female were incubated in a Heath Tecna Incubator.

Coho Salmon Capture and Handling

Under the authority of ADF&G collectors permit 75-303, issued August 15, and with the permission of the local office of ADF&G Commercial Fish Division, on October 7th, we captured 7 female and 3 male coho salmon in Indian River above the Sheldon Jackson College diversion dam. These salmon were taken by seining for the purpose of exposing our hatchery students to the culture of yet another salmon species. They were transported live by truck in a tank of water to the hatchery site where they were held under cover in a pen

in the flume tailrace. No weights were taken but fork lengths of the adults after spawning were:

63.5 cm.	68.6 cm.
63.5	69.3
64.8	71.6
66.0	72.4
66.5	
68.6	

Coho Spawning Results

Six females were spawned, one each on October 20, 21, 23, and November 3, 10, 13. The seventh female did not ripen and was preserved for later class dissection. About 12,000 coho eggs were incubated in a Heath Tecna Incubator.

Incubation Procedures and Results

Egg Incubation

Newly fertilized and partially water hardened pink salmon eggs were spread onto 1/4 inch Vexar plastic mesh trays in place under water in the shallow matrix incubators. The trays were four feet square and stacked four deep over a shallow gravel substrate. Baffles directed water flow to the bottom of each unit, across the gravel and up through the trays and on to the next box until exiting into a common discharge trough at the end of each of the six rows. A row consisted of 4' x 8' x 1' deep plywood boxes with center baffles creating eight incubator units with a total length of 32 feet.

Pink salmon eggs were stocked at a density of 7.5 - 8 per square inch, on each tray. After eye up, the trays were thinned to two per unit in most boxes. Six units were maintained at a four tray density for later survival comparison.

The outdoor incubators were covered with plywood lids and styrofoam cut to size was floated on the water surface. This styrofoam helped as additional light prevention and was planned as some protection against water freeze up. Wood bark and chips donated by Alaska Lumber and Pulp Company provided further insulation between incubator rows. These precautions were not put to the test during this past winter as air temperatures remained relatively mild and no severe or prolonged freezing periods occurred. A monthly water temperature profile for the SJC hatchery is presented in Table 5.

Chum eggs were stocked at approximately 4.3 per square inch per tray in two 4-tray units. The eggs from the one Indian River chum were incubated in a Heath Tecna tray.

All coho eggs were maintained in a Heath Tecna incubator.

Eye up was over 95% for all three species and it was not necessary to conduct fungus control treatments. Prior to hatching, the dissolved oxygen of incoming incubator water was never less than 90% of saturation relative to water temperature (ranged from 10.5 - 14 mg/litre) and decreased very little at the outlet after passing through 300,000 to 380,000 eggs at 56 litres/minute.

Egg Incubation Problems

During the course of an otherwise routine egg incubation, two things happened which are worth noting. Shortly after stocking was completed, the four trays of eggs in the upper unit of each row functioned as a filtering-settling system and became progressively more covered with silt and debris during the fall high water period of Indian River. When the eggs reached the eyed stage and could be handled, we removed these trays, washed the eggs off while still on the tray and moved them to lower

Table 5 Water temperatures at SJC hatchery 1975-76 recorded by Taylor 7 day recording thermograph in degrees Celsius

Month	Low	High	Mean
June	3.5	7.5	5.1
July	5.0	8.5	6.4
August	6.5	10.0	7.5
September	6.0	10.0	8.7
October	4.5	8.5	7.1
November	2.5	4.5	3.5
December	1.5	4.0	2.7
January	2.0	4.0	2.8
February	0.5	3.5	2.8
March	0.5	4.0	2.3
April	2.5	5.5	3.7
May	3.5	7.0	4.6

incubation units. We found no excess egg mortality on these trays. Apparently the eggs received sufficient oxygen from the water flowing under the trays past that portion of egg exposed through the mesh. We put blank trays back in these upper units and continued using them as settling basins until just prior to hatching. By then, Indian River flow was stable and clean and two trays of eggs were returned to each upper unit.

Also during the early months of egg incubation, a growth of filamentous material occurred in the covered incubation boxes and was thought to be a colonial form of iron bacteria. ADF&G fish pathologist, Dr. Roger Grischkowsky during his hatchery site inspection here, took a sample and perhaps it can be identified. It was a floculent growth which settled loosely on the trays but was not attached to the eggs. Our main concern was that it might interfere with good water circulation and prior to hatching the trays were removed while each unit was siphoned to insure the sac fry a start on clean gravel. This growth did not recur to any extent after the eggs hatched which was probably due to a combination of colder water temperatures and removal of the trays.

Sac Fry Incubation

Table 6 presents the statistics on eggs, hatching and number of swim up fry for each salmon species. After hatching was completed, trays were removed and the remaining dead eggs enumerated volumetrically.

The 96% hatch for pink salmon meant that fry density was 15.0 to 15.8 per square inch except for the six units where this density range was doubled. Although the water outlet oxygen values never dropped below 9.2 mg/litre at 38-45 litres/minute, these densities

Table 6 Survival data for eggs and fry incubated at SJC hatchery 1975-76

Species	# Eggs	% Hatch	# Sac Fry	% Fry - Survival to swim up	# fry swim up	% survival egg to swim up
Pink	1,747,935	96	1,678,017	98.5	1,653,666	94.6
Chum	77,000	95.7	73,689	95.7	70,531	91.5
Coho	12,622	98	12,369	94.9	11,739	93.0

of 30 fry per square inch apparently caused some smothering of sac fry in each of these units. It was more prominent in the lower unit of the 4' x 8' boxes indicating that fry from the upper unit had migrated down past the center baffle and increased the density there even more.

Premature Emigration

Data were obtained from January 5 to January 19 about one month after hatching on premature emigration of sac fry from the shallow matrix incubators by enumerating those collected at the outlet of each incubator row. This was not a controlled experiment so results are not subject to valid statistical analysis but because of the large differences in numbers moving (ranging from 4 in one row to a high of 6564 in another) some possible causes are suggested.

1. More fry emigrated from the rows containing some high density units (30 fry per square inch).
2. Between two rows with some high density units, more fry were caught leaving the row when those units were close to the outlet. Those in the upper half of another row probably spread out somewhat in the downstream units and not as many reached the outlet.
3. Two rows had similar normal densities but the row with fry one week older had higher out migration during the same period of time.
4. Another indication of density effect on premature movement occurred in the uppermost unit of one row. Here a 30 fry per square inch density of Indian River X Katlian River pink salmon had been isolated for a future marking program by leaving the second unit empty and screening these two units off from the rest of the row downstream. Only a limited number of fry moved into empty lower unit indicating that movement ceased after an apparent tolerable density level of 20-25 fry/inch^2 was reached.

On January 19, a screen was placed at the lower end of each 4' x 8' incubator to prevent any further premature movement.

Those premature migrants collected at the incubator outlets were brought into the basement hatchery room and placed in an aluminum trough to complete development and after swim-up, were fed Oregon Moist diet until released. A few hundred were reared in 10 degree C. water to speed up their development and give us some advanced time to observe their feeding behavior. A similar project was carried out by one of the students with 200 coho eggs hatched and reared to feeding fry in a heated aquarium.

It was also thought possible to back calculate temperature units of those fry reared in heated water to give an approximate time when those in the outdoor incubators would want to feed. This technique may be useful and we hope to refine it next spring.

Release of Pink Salmon Fry

During the weekend of March 21, it was noted that some of the oldest pink fry in the outdoor incubators swam up when exposed to light and so on March 23, the outlet screens were removed from all incubators except those reserved for the later marking study groups. After notifying ADF&G personnel in Sitka, Juneau and Anchorage, the first fry release took place during the night of March 24. The schedule of all pink salmon fry releases is listed in Table 7. It was apparent from subsequent releases that we had held back perhaps as much as a week some fry that would have left sooner. These fry were not buttoned up and had a good amount of yolk material left so they were not starved but did eat when presented with Oregon Moist diet.

Table 7 Pink salmon fry released spring 1976 from SJC hatchery

Date	Number Released	Number/Kilogram
March 24	278,743	3499
25	35,591	3510
26	42,865	3606
27	34,271	
29	55,312	
30	18,331	
31	15,302	
April 1	22,236	3596
2	34,190	3686
3	77,598	
4	51,620	
5	41,230	
6	42,906	
7	106,258	
8	110,129	3669
9	50,046	
10	90,572	
11	49,458	
12	56,044	
13	43,475	3594
14	41,276	
15	40,850	
16	45,037	
17	30,627	3623
18	34,422	
19	19,077	
20	18,010	
21	13,862	
22	30,655	
23	23,817	3711
26	15,966	
27	2,259	3770
28	1,122	
29	25,138	
May 1	10,638	3726
2	11,733	3766
22	33,000	3484
TOTAL	1,653,666	

Release Method

Emigrating fry were collected in 1/8" Vexar screen boxes 24" x 18" x 15" deep at the end of each incubator row. Total number was then estimated by sample count per unit weight extrapolated to total weight. Fish were netted out of the boxes or poured from the box into a hand net held in water. Although as much water as possible was drained from the hand net prior to dumping the fry into a bucket of pre-weighed water, it was found that an overestimate up to 10% could occur because of net water added to the weighing bucket.

After weighing, the fry were released into the 35' x 30" x 15" deep trough which collected the overflow water from all six rows of incubators. Water exited from this trough via a six inch overflow standpipe connected to a four inch PVC pipe 40 feet in length and then into the tailrace intertidal area 12 feet below. After dark the outlet screen was removed and the fry allowed to exit voluntarily over the lip of the standpipe. However, it became apparent after a few days that not all would leave voluntarily and the population in the trough began building up. We therefore began putting each days emigrants into a separate 4' x 8' x 18" deep box. This box had a 1" bottom drain which opened into a 20 foot length of 4" PVC pipe which in turn emptied into a 20 foot length of vinyl lined 7" wide trough. This open trough at the end made it possible to release the fry at the water surface of the intertidal area whatever the tide level. Although we had tested releasing the fry through the entire distance with pipe and saw no evidence of injury it was felt surface release might be less of a potential shock to the fry than ejection at the bottom of a 4-5 foot column of saltwater when the tide was in. Fry were put into the release

box in the morning and released the evening of the same day by draining the box. Observation showed that fry flowed smoothly down the trough into the tidal water if the tide was in or if it was low tide, into a pocket of fresh water created by the closed end of the trough from which they then gently overflowed into the tailrace.

Release Behavior Observations

Each release of pink fry tended to remain in the immediate area for 1-2 days and then moved away along the shoreline. As the releases continued, salmon fry were reported sighted in Crescent Boat Harbour, along the Sitka shoreline, and around to the ANB dock north of the city.

During the peak period of pink salmon emigration from the incubators, observations were made to determine what time of the day movement was occurring. The incubators remained covered so that fry were in darkness until dropping back over the exit lip of each end unit into the catch box. Number of fry exiting were recorded for two minutes at each of the six rows on three different time periods during bright sunny afternoons. A rate per minute was then calculated and an expected number projected which was compared to the actual number taken from the catch boxes the next day. On two occasions, the figures indicated that rate of emigration may have increased during the evening and night while the third time period checked indicated a much faster rate may have occurred during daylight.

Chum Salmon Swim Up

Chum salmon fry began swimming up during the week of May 19 and 70,000 were brought into the hatchery basement room for short term rearing . They are being held in two 4' x 8' x 18" deep boxes and two aluminum troughs and fed Oregon Moist diet.

They will be released at a larger size in an attempt to gain a larger adult return from this relatively small number of salmon.

Coho Salmon Swim Up

The coho salmon were grouped into 2 time periods of age and removed from the Heath incubators during the first weeks of May and June. They were put into aluminum troughs and fed Oregon Moist diet.

Marking Program

With approval of the Mark Allocation Committee and advice from National Marine Fisheries Service biologists we undertook a marking program on pink and chum salmon fry to compare the future returns on three genetic groups of pink salmon and two of chum salmon. Originally it was hoped we could fin clip 30,000 of each lot but it soon became apparent that during this first program year we did not have the time nor personnel for that large a committment so we settled for 10,000 of each group. Table 8 lists numbers and dates of release for fin clipped pink salmon fry.

Marking Method

Fry were anesthesized in a 1:7500 solution of MS-222 and the designated fin removed using stainless steel micro-dissecting scissors. Vision of workers was enhanced during the fin clipping process by holding the fry under a Luxo illuminated magnifier lamp with a 3 diopter glass lens and circular fluorescent bulb. Fry were then returned to fresh water for recovery and added to the next nights release into the tailrace intertidal area.

Table 8 Pink Salmon Marked Fry Release 1976

LV = Indian River
RV = Indian River X Katlian River
AD = Katlian River

Date of Release	LV	RV	AD
April 14	100	0	
16	400	1500	
17	1305	500	
19	1112	507	
20	57	825	
21	401	615	
22	506	668	
23	532	0	
26	1072	892	
27	832	1427	
28	498	624	
29	460	682	
May 1	1400	430	
2	1330	1330	
22			10,000
TOTAL	10,000	10,000	10,000

Marking Results

Students and staff marked the first two groups of 20,000 pink fry. Clip rate averaged between 300-400 fry per hour for the single fin removal. Mortality from the marking process was 0.1%. The next marking period occurred after the school year ended and a crew of two women and three high school students were hired to mark the last 10,000 pink and 10,000 chum fry. Mortality during this marking period rose to 1% which was attributed in part to stress from a heavy infestation of an external parasite discoverd at that time.

The Katlian Adipose clip group was a month or more younger than the other two pink salmon lots so could not be released at the same time. Because of the environmental differences in Crescent Bay that occurred during these two time release periods it will probably not be valid to compare the returns of all three pink salmon groups. Weekly plankton tows in Crescent Bay in front of the hatchery area showed the presence of food organisms that can be utilized by salmon fry such as copepod, barnacle and shrimp larvae, in increasing numbers starting several weeks before the first release. However, by May 22, a full plankton bloom had occurred and the last pink salmon group was probably released into a better environment relative to food abundance and possible cover. However, since this group was released in apparent good condition and into a good food supply, their return or lack of, should at least provide some more useful information on the feasibility of using a transplanted egg stock with both parents from the donor stream.

Parasite Treatment

Shortly after the chums were put into rearing boxes, their

behavior indicated some form of stress and a higher mortality rate was occurring among the clipped fin groups than experienced with the pink salmon. Examination under a dissecting scope revealed an extremely heavy infestation of the external protozoan parasite Trichodina. Fortunately it is one of the easier pests to treat and a 1:5000 continuous flow treatment for one hour with Formalin brought immediate results and above normal mortalities ceased. A second treatment was given 10 days later to prevent recurrent build up of the parasite. The cohos and a small lot of 200 pinks were also found to be parasitized but not as heavily as the chums. They had build up while the chums were still in the incubators and next year salmon fry will have to be examined for possible treatment prior to swim up. Saltwater is also an effective treatment for Trichodina so if any of the earlier pink salmon were infected, their release into the ocean should have eliminated it. It is probable that the chums were more heavily infected because they were in the incubators longer and during a time when the water temperature was warming, allowing the parasite population to increase more rapidly.

The chums will be released after 4-6 weeks of feeding. During the first three weeks of feeding, they have gained about 50% in weight.

Future Hatchery Plans

On May 7, 1976 The Board of Directors of Northwest Area Foundation authorized a two-year grant of $214,452 to Sheldon Jackson College for the purpose of continuing and expanding the presently funded Sheldon Jackson College Salmon Aquaculture Program.

Hatchery Tailrace

An upper section of the hydroelectric tailrace has been excavated to construct a larger adult salmon capture and holding area .

Weir trap and holding pens will be organized to provide maximum efficiency by minimizing handling of salmon. Minimal handling in an area of sufficient but low velocity water flow will result in optimum holding conditions for the salmon and working conditions for the handlers.

Donor Stock Sites

Use of weirs on Katlian River, South Fork, and Indian River is again planned for this fall. Considering the low pink salmon run forecast, it is expected that their use will be crucial to the 1976 egg take. The same weir design will be used again at South Fork as we feel last year's wash out was not due to weir design but could have been avoided by either pulling the panels or maintaining a watch during the entire night or at least frequent checks. Construction will be modified slightly by making weir panels three feet instead of four feet in height and using conduit pipe in place of 1 x 4 slats.

Incubation Facilities

The Netarts-type boxes will again be the primary incubation system for 1976. Additional equipment will be installed in the indoor basement room such as more Heath Tecna incubators and some incubator boxes donated by the National Marine Fisheries Service.

Toward the first salmon returns in 1977, we are beginning construction this year of additional incubator facilities. We have been funded to construct a building to house an incubator capacity of 6-10 million eggs. It appears at this time that a shallow gravel incubation system will probably be used unless government research turns up something better in the next year.

The building will be located near the present incubators but not in the same spot so that the old system can continue to be operational during construction.

Egg Needs

Considering the forecast of low runs for salmon this year, it is realized that availability of donor stock will be questionable. Nevertheless, it is requested that the permit allowance for the SJC hatchery be increased to 2 million pink salmon eggs, and 1 million chum salmon eggs for 1976. Between the inside and outside incubators, we have the ability to incubate this many if available.

Program Budget

Attached to this report are copies of the 1975-76 program budget and newly funded budget for 1976-78.

ACKNOWLEDGEMENTS

The SJC Aquaculture staff wishes to thank the Northwest Area Foundation for their continuing financial support. We gratefully acknowledge their faith in the merit of this program and our endeavors thus far by their approval of another two year grant towards our goal of becoming self-sustaining.

We appreciate the cooperation and advice of the personnel of the Alaska Dept. of Fish and Game and National Marine Fisheries Service and hope through projects of mutual interest to repay some of this debt.

We look forward to another fall's work within the jurisdiciton of the U.S. Forest Service and the U.S. Park Service and pledge to respect the resources in their trust.

Our Advisory Committee members, as usual, gave generously of their time and we look forward to the next meeting in November.

To all those who have contributed financially or otherwise to our progtam please accept our thanks for now and know that we hope to repay in part through our students and salmon enhancement.

Appendix A

Financial Report

	FY 75 Budgeted	FY 75 Spent	FY 76 Budgeted plus 75 balance	FY 76 spent to May 31	Balance
I. Salaries					
Foundation	29,942.06		38,749.00		
Matching	6,800.00		7,140.00		
Total	36,742.06	33,739.10	48,891.96	35,843.51	13,048.45
Fringe					
Foundation	3,901.59		6,587.00		
Matching	1,156.00		1,213.80		
Total	5,057.59	4,080.71	9,777.88	12,078.91	-3,301.03
II. Equipment					
Foundation	39,729.15	18,497.53			
NSF	7,148.31	7,148.31			
Total	46,877.46	25,645.89	22,231.57	20,056.91	2,174.66
III. Travel	2,000.00	1,317.33	5,857.67	249.49	5,608.18
IV. Other	5,000.00	2,542.31	7,457.69	5,107.04	2,350.65
Office Supplies					
Student Assist.					
Secretary					
Visiting Lecturers					
Teaching Materials					
Long Distance					
Misc.					
Total Foundation	80,573.00		57,011.00		
Foundation + Matching	95,677.11	67,825.34	93,216.77	73,335.86	19,880.91*

* Balance available for operational expenses during June and encumbered money to complete projects during summer months. Final financial report will be available about July 30.

Appendix B

TECHNICAL ADVISORY COMMITTEE

Revised Membership

Chairman:

Dr. William McNeil, Chief
Anadromous Fishes Investigations
National Marine Fisheries Service
Auke Bay, Alaska

Representative
Metlakatla Island Reserve

W.I. (Bob) Palmer, Director
Alaska Fisheries Council
Juneau

Ms. Sheila Skannes
Vocational Counseling Aide
Bureau of Indian Affairs
Juneau

Mr. Pete Azure, Director
Native Studies Program
Sheldon Jackson College

Mr. Richard Eliason
State Representative
Sitka

Mr. Ross Soboleff
Director
Office of Development Planning
Tlingit and Haida Central Council
Juneau

Mr. Dave Houseworth
Fisheries Consultant to
Metlakatla Island Reserve
Division of Fisheries Services
Ketchikan

Mr. Mark Jacobs, Jr.
Board of Directors
SEALASKA Corporation

Mr. Chet Mattson
Supervisory Fisheries
Research Biologist
National Marine Fisheries Service
Auke Bay

Dr. Ken Leon
Biologist
F.R.E.D. Division
Alaska Dept. of Fish and Game
Juneau

Dr. Richard Nevé
Coordinator of Shore Programs
Professor of Marine Science
University of Alaska
Seward

Representative
Alaska Native Brotherhood
Camp #1
Sitka

Mr. James Parker
Area Management Biologist
Alaska Dept. of Fish and Game
Sitka

Mr. Edwin Sholz
Assistant to the President
for Advancement
Sheldon Jackson College

Mr. Alan Otness
Administrative Assistant
Petersburg Fisheries, Inc.

Dr. Richard Gard, Head
Division of Fisheries
Southeastern Senior College
Juneau, Alaska

Mr. Dexter Kyle
Southeast Alaska Trollers Association
Sitka

Mr. Mike Perensovich
U.S. Forest Service
Sitka Alaska

Mr. Sam Fortier
Director of Manpower Services
Bristol Bay Native Association

Appendix C

WILLIAM J. MCNEIL
CHAIRMAN

W. I. BOB PALMER
PROJECT COORDINATOR

STATE OF ALASKA
OFFICE OF THE GOVERNOR
ALASKA FISHERIES COUNCIL

CHAIRMAN'S REPORT ON THIRD TECHNICAL ADVISORY COMMITTEE MEETING OF THE SHELDON JACKSON COLLEGE AQUACULTURE PROGRAM

The third Technical Advisory Committee meeting was held Tuesday, May 4, 1976, at the Sheldon Jackson campus. The following individuals participated in the meeting:

Dr. Charles Bovee, SJC
Mr. David Bright, SJC
Mr. John Galazin, USFS
Dr. Richard Gard, University of Alaska
Mr. David Houseworth, USFWS
Mr. Dexter Kyle, Southeast Alaska Trollers Association
Mr. Dennis Lund, SJC
Mr. Chester Mattson, NMFS
Dr. William McNeil, NMFS and Alaska Fisheries Council
Mr. W. I. "Bob" Palmer, Alaska Fisheries Council
Mr. James Parker, ADF&G
Mr. Mel Seifert, SJC
Mr. Ross Soboleff, Tlingit & Haida Central Council
Mr. David Turcott, SJC

Hatchery operations were very successful this past winter, with 1.65 million pink fry released in spring, 1976. Approximately 0.07 million chum fry are still in incubators and are expected to emigrate soon. Twenty thousand pink fry were marked to evaluate feasibility of transplanting stocks to the SJC hatchery. Unmarked pink fry were native to the hatchery stream.

The program started with 16 students enrolled in the technician training program in September, 1975. Two students dropped out in the first semester and nine in the second semester. Only five of the original 16 completed the two semesters. It is evident that many of the students who enrolled in the first year were not highly motivated. This was somewhat of a disappointment. However, there are positive indications that student motivation will improve.

The program was not well known last year, even though SJC conducted an extensive campaign to advertise it. It appears, nevertheless, that the program is receiving favorable recognition, and applications have been received for the September, 1976, entering class. Nine applicants are Native and seven are female. More applications are anticipated, and the program will probably accept the 15 most promising applicants. The problem of motivation is very likely to resolve itself.

The tentative plan for harvesting surplus salmon returning to the SJC hatchery in 1977 was reviewed. The Committee recommended that the College present the plan to local fisheries groups for suggestions before a final plan is prepared for review by ADF&G. This subject will be of high priority for the autumn, 1976, meeting of the Committee.

In addition to pink and chum fry, SJC has also produced a quantity of coho fry which are surplus to their needs for teaching. The Committee recommended that SJC work with ADF&G to develop a program for stocking these surplus coho fry in ponds and small lakes in the Sitka area to benefit commercial and recreational areas.

Activities of the Alaska Fisheries Council and status of legislation concerning public and private, non-profit hatcheries were reviewed for the Committee by Mr. Palmer. Mr. Palmer is Special Projects Coordinator for Governor Hammond, and he has agreed to serve on the Technical Advisory Committee.

The Committee is also fortunate in obtaining the services of Dr. Gard, who heads the fisheries program for the University of Alaska, Juneau. Participation of Dr. Gard will help to ensure close coordination between SJC and the University.

William J. McNeil

Appendix D

DIRECTOR'S REPORT

Third Technical Advisory Board Meeting of the Sheldon Jackson College Aquaculture Program

INTRODUCTION OF MEMBERS:

Thirteen people participated in this meeting, their names and affiliations are listed in Chairman William McNeil's report. Mr. Bob Palmer, Director of Alaska Fisheries Council and former Chief of Staff to Governor Hammond, and Dr. Richard Gard, Director of the Fisheries Program at the University of Alaska's Juneau campus arrived with Dr. McNeil and participated in the meeting. Dexter Kyle was introduced as a new member representing commercial fishermen.

AQUACULTURE STAFF REPORTS:

Seifert presented an update on hatchery operations with Dave Bright, Hatchery Supervisor and Dennis Lund, Instructor, adding appropriate comments. Egg take and incubation to eyed stage was reported at last November's meeting. This report continued on with incubation through hatching and alevin development, fry release, ADF&G hatchery inspection and marking study with selected slides of these activities as visual aids.

Here is an abbreviated summary: Netarts-type incubation system in general worked well for us with no major problems this year. Several areas of concern did not cause any serious problems. One was the development during the warmer water period of fall of a filamentous brown growth which we presume to be a colonial form of iron bacteria similar to that encountered at Auke Bay. Our fear was that it might inhibit proper water flow around the eggs but egg mortality remained low indicating it did not. Dr. Roger Grischokowsky, ADF&G fish pathologist, is attempting to identify this material for us. The first box in each row with its 4 egg trays functioned as a water filter and a great deal of silt settled on the eggs. Again, water flow past the bottom of each tray must have supplied sufficient oxygen as no increased mortality was noted. Once the eggs eyed, the trays of eggs were removed and the boxes flushed and siphoned out to provide clean gravel for the future alevins. Neither of these situations recurred to any extent during the winter period of colder weather and more stable stream flows. Comparitively mild winter conditions provided no freezing problems for our outdoor system this year so we have not really been put to the test yet in this area.

Alevins developed normally and were in a healthy condition at release time. Four of the 48 incubation boxes were stocked at twice the density as the others, 75,000 versus 37,000 alevins which resulted in piling up and suffication of some fry even though total available oxygen was sufficient. Thus we now know that to increase future production we cannot merely increase density in the same incubators. It will require more incubation space as well.

In cooperation with ADF&G and the Pacific Northwest Fisheries Marking Committee, we undertook a fry marking study on three lots of pink salmon and two lots of chum salmon. So far, 20,000 pink salmon representing two of the lots have been marked by fin clip. When adults return, we will be collecting comparative data on homing back to Indian River of Indian River salmon, Katlian River salmon and a cross between the two strains. Approximately 1.8 million pink salmon eggs were taken, 1.71 million hatched and 1.65 million released to the ocean. The 70,000 chum and 10,000 coho salmon are being held for feeding and growth prior to release.

ACADEMIC REPORT:

Dennis Lund reported on student instruction. For the benefit of new members, he reviewed the purpose of the program and program development during the first year of 1974-75. Discussion then focused on this years class and the reasons for the apparently high attrition rate. The class began with 16 students last fall end ended with 5 this spring. However, only 11 of those beginning students could have been considered full-time hatchery technician majors.

One student entered the program without a high school diploma and found pressures of coping with finishing high school requirements and maintaining a disciplined college schedule too much to handle at that stage of his life. Another from Sas., Canada, signed up on a Friday and dropped from School on the following Monday. Two changed their status from hatchery technician to transfer students. One taking the course for personal knowledge to build his own salmon hatchery changed from credit to auditing the second semester. One married student ran into financial problems second semester. One was doing well in his classes but had problems at home which weighed on his mind a great deal the first semester. He has written he'd like to return to SJ possible next fall. Two other students had a great deal of academic problems in all their classes. One of these was due mostly to personal conduct and lack of concentration in a single direction but he is working full time now here in Sitka and says he has his personal problems under control and wants to start again next year and the last two students took the first semester course apparently out of a general interest in fisheries but decided that hatchery work was not a specialty they wanted.

So considering all these circumstances we ended up with five motivated capable students. Three of these five were among the top 15 freshman academically and one from Metlakatla who changed to transfer status was top freshman with a straight A average.

Mr. Lund then proceded to outline his plans and directions for this summer and the next school year: develop a fishery science course for second year students; improve fish husbandry classes; modify the fish biology course; consult with othe instructors on variable credit; individualize instruction; etc, to serve all levels of student abilities. He felt that one more year of teaching experience with the hectic initial course preparations behind him would put the curriculum on a firm basis. If additional funds become available we will hire another instructor who would teach advanced fish culture, fish biology, and extra sections of beginning biology, which is expanding because of the Aquaculture Program.

Another instructor to aid the teaching load and provide more student supervision will become important as indicated by Mr. Seifert's announcement that more than the quota of 15 applicants have already been recieved for next fall's beginning hatchery technician class. To date, 40-50 inquires have been recived resulting in 27 applications for this fall's technician class. Ten applicants are Native of which five are women. A total of ten women have applied for the program.

GRANT APPLICATIONS

Dave Turcott reviewed NSF aplication for seawater lab support and outlined current plans to put into operation those materials already on hand. Water intake and pipe system to be installed from Crescent Bay into Sage Building and connected to pumps during May. Some plastic sheets have been ordered to build aquaria next fall. Any further development will have to await future funding. This sealab room will primarily be used as additional student instruction space for fisheries and marine biology classes. It was brought up by Seifert that considering the increase of tourist cruise ships from 70 to over 100 stopping in Sitka this year a tremendous number of people will pass by Sage Building May into October, it is conceivable that the combination of salmon hatchery and sealab could become an educational attraction providing summer work as guides for a couple of students. Donations like the .50 per person currently charged at the SJ museum could pay the student guide wages and perhaps the sealab maintenance costs. It is something to consider for the future. Already this year, many visitors have toured through the hatchery including school children from 2nd grade through high school

from local and other village schools. It is obvious that this type of activity will greatly increase next school year creating a large demand on staff time unless other personnel are made available for it ahead of time.

In addition to the possible NSF funds, a brief summary was given on the Northwest Area Foundation grant application for 1976-78 and some discussion on needs that could be met by this grant, especially with respect to student instruction.

SUMMER WORK:

It was not known at this time if any major construction would be initiated this summer until funds become available, in terms of hatchery production expansion, it was agreed that it must occur to put the program on a self sustaining level of production, but was also noted that 1) it takes time to order materials; 2) the staff's first obligation is to the students and so what major construction that can be afforded should be contracted rather than staff conducted; 3) the forecast for this fall's pink and chum salmon runs to be low so we might have trouble increasing our egg needs over that obtained from last year. Therefore, the big push for expansion may come during the summer of 1977. One thing that will hopefully occur this summer is an improvement in adult salmon trapping and holding area next to Sage Building. Even if no large runs show up this year, it will give us experience and preparation for the 1977 return of hatchery salmon.

Also on the agenda is general hatchery improvements and weir construction for adult salmon. At least one SJ student will be employed full-time. It was pointed out by Lund that more state, private, and federal agency jobs were available for this summer than we had students to apply. The opportunities are already there and the value of temporary work on their record for future permanent employment is stressed to the students.

FALL EGG TAKE:

As mentioned above, the salmon forecast for this fall is for a low run. Therefore we anticipate a far greater need for and use of the weir sites than last fall when the pink salmon came to our doorstep. Pending increased facilities for larger amounts, we want to increase our egg take to 3 million total. However, Jim Parker, ADF&G, said considering the forecast we might have trouble just equaling last year's egg take as current ADF&G policy mandates that the requirements of the natural stream for salmon escapement come before private hatcheries needs. If most of this years eggs are from a donor stream, we can anticipate that more effort will be required to transport a larger number of people to and from the weir site with all the logistics necessary among people and boats.

It was reported that Prince William Sound Aquaculture Corporation had good egg survival from planting eyed eggs in stream gravel last fall when their water supply froze up. Chet Mattson suggested we should investigate using the hydro tailrace for expansion of incubation capacity.

OTHER TOPICS:

Seifert reported ADF&G fish pathologist, Dr. Roger Grischkowsky inspected the hatchery as required by law and reported the pre-release pink salmon fry "showed no apparent defects and were large fish with robust behavior."

The subject of adult harvest beginning in 1977 was discussed and will continue to be an important topic at next fall's meeting. Dexter Kyle emphasized that commercial fishermen get nervouse about exclusive harvest areas for hatcheries and special effort needs to be made to enlighten them on the necessity of any such proposal. It was suggested that the Sheldon Jackson College fisheries staff work up a series of alternative proposals and submit them to the Fisheries Advisory Board here in Sitka. Dennis Lund was recently elected to this board. It should also be submitted to ADF&G. After the Fisheries Advisory Board has reviewed and responded to the harvest proposals which probably wont be until next fall, the results should be sent to the Alaska Fisheries Council

We will be rearing some of our Indian River cohos to smolt size but do not have the space to maintain all 12,000 fry that long. It was suggested we work with ADF&G Sport and Commercial Divisions and SEATA and donate the surplus fry for stocking a small lake in the Goddard area.

The committee recommended that we invite next fall's technician students to select a student member to the Aquaculture Program Technical Advisory Committee.

Bob Palmer, Project Coordinator of Alaska Fisheries Council outlined the background and current status of the Council's major areas of effort:

1. House Bill 615 proposed a bond issue of $44 million for state salmon enhancement projects including 8-9 major hatcheries. Natural Resources Committee reduced this to $19 million. House Finance Committee looked upon it more favourably and was believed to bring it to the floor at around $29 million. (NOTE:) Since this meeting, the legislature voted to put the bond issue before the Alaska constituency at $27 million. Mr. Palmer stated if passed by the Alaska voters, this would quadruple the states facilities and certainly create a need for trained salmon

hatchery personnel.

2. Senate Bill 688. Contained certain modifications of current non-profit salmon hatchery act. As part of this bill, the next meeting of the Alaska Fisheries council will focus on possible zoning for areas of artifical recruitment. For example: Unlimited - some areas on outside waters might fall into this catagory where no management conflict would arise in mingling hatchery and wild stocks; Restricted - such as some inside waters like Burnett Inlet where possible management problems could occur between artificial and natural stocks so hatchery production would be limited to prevent damaging natural stocks; None - no hatcheries would be allowed for reasons such as to provide protection for genetically important stocks or where separation of hatchery and wild stocks prior to harvest is impossible. Mr. Palmer felt this proposal might take a long time to implement so there is a need to set up an interim zoning plan.

3. Senate Bill 689. Private hatchery loan bill bond would provide a revolving loan up to $3 million for regional corporation member hatcheries or $300,000 for independent hatchery corporations. Moratorium for six years on repayment of principal and interest and no more than 8% interest. Bill presently held up in Senate Finance Committee.

Dr. McNeil suggested that Mr. Palmer and Dr. Gard become permanent members of the Aquaculture Technical Advisory Committee. Agreement was unanimous and Mr. Palmer accepted. Dr. Gard had left earlier and a letter of invitation is being send to him for his consideration.

It was also suggested and agreed upon by those present that a letter be sent to members having missed two consecutive meetins as to whether they wish to remain on the SJ Technical Advisory Committee.

Mel Seifert

Mel Seifert, Director